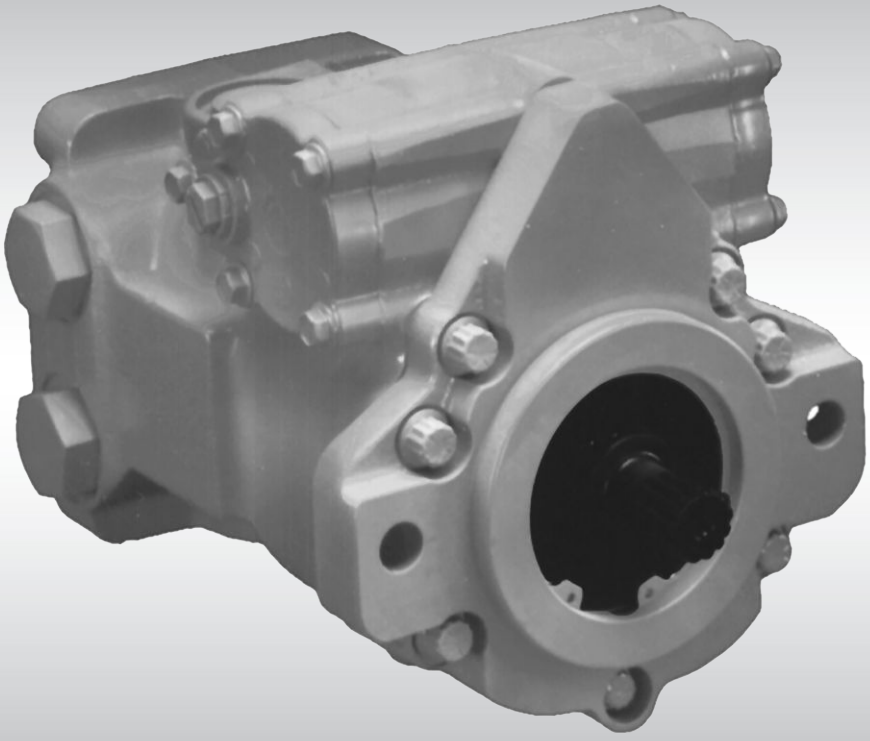
MAKING MODERN LIVING POSSIBLE

Service Manual

Axial Piston Variable Motor

Series 40 M46



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Introduction

Overview

This manual includes information for the installation, maintenance, and minor repair of the M46 motor. It includes a description of the unit and its individual components, troubleshooting information, and minor repair procedures. For information regarding general operation, operating parameters, or technical specifications, refer to *Series 40 Motors Technical Information manual* **520L0636**.

Performing minor repairs requires the unit to be removed from the vehicle/machine. Thoroughly clean the unit before beginning maintenance, or repair activities. Since dirt and contamination are the greatest enemies of any type of hydraulic equipment, follow cleanliness requirements strictly. This is especially important when changing the system filter and when removing hoses or plumbing.

A worldwide network of Danfoss Global Service Partners is available for major repairs. Danfoss Global Service Partners are trained by the factory and certified on a regular basis. You can locate your nearest Global Service Partner using the distributor locator at www.powersolutions.danfoss.com.

Warranty

Performing installation, maintenance, and minor repairs according to the procedures in this manual will not affect your warranty. Major repairs requiring the removal of a unit's rear cover or front cover voids the warranty unless done by a Danfoss Global Service Partner.

General instructions

Follow these general procedures when repairing series 40 M46 variable displacement closed circuit motors.

Remove the unit

Prior to performing major repairs, remove the unit from the vehicle/machine. Chock the wheels on the vehicle or lock the mechanism to inhibit movement. Be aware that hydraulic fluid may be under high pressure and/or hot. Inspect the outside of the pump and fittings for damage. Cap hoses after removal to prevent contamination.

Keep it clean

Cleanliness is a primary means of assuring satisfactory pump life, on either new or repaired units. Clean the outside of the pump thoroughly before disassembly. Take care to avoid contamination of the system ports. Cleaning parts by using a clean solvent wash and air drying is usually adequate.

As with any precision equipment, all parts must be kept free of foreign materials and chemicals. Protect all exposed sealing surfaces and open cavities from damage and foreign material. If left unattended, cover the motor with a protective layer of plastic.

Replace all O-rings and gaskets

It is recommended that all O-rings be replaced. Lightly lubricate all O-rings with clean petroleum jelly prior to assembly.

Introduction

Secure the unit

For major repair, place the unit in a stable position with the shaft pointing downward. It will be necessary to secure the motor while removing and torquing controls and valves.

Safety precautions

Always consider safety precautions before beginning a service procedure. Protect yourself and others from injury. Take the following general precautions whenever servicing a hydraulic system.

Unintended machine movement

Warning

Unintended movement of the machine or mechanism may cause injury to the technician or bystanders. To protect against unintended movement, secure the machine or disable/disconnect the mechanism while servicing.

Flammable cleaning solvents

Warning

Some cleaning solvents are flammable. To avoid possible fire, do not use cleaning solvents in an area where a source of ignition may be present.

Fluid under pressure

Warning

Escaping hydraulic fluid under pressure can have sufficient force to penetrate your skin causing serious injury and/or infection. This fluid may also be hot enough to cause burns. Use caution when dealing with hydraulic fluid under pressure. Relieve pressure in the system before removing hoses, fittings, gauges, or components. Never use your hand or any other body part to check for leaks in a pressurized line. Seek medical attention immediately if you are cut by hydraulic fluid.

Personal safety

Warning

Protect yourself from injury. Use proper safety equipment, including safety glasses, at all times.

Hazardous material

Warning

Hydraulic fluid contains hazardous material. Avoid prolonged contact with hydraulic fluid. Always dispose of used hydraulic fluid according to state, and federal environmental regulations.

Introduction

Symbols used in Danfoss literature

WARNING may result in injury

CAUTION may result in damage to product or property

Reusable part

Non-reusable part, use a new part

Non-removable item

Option - either part may exist

Superseded - parts are not interchangeable

Measurement required

Flatness specification

Parallelism specification

External hex head

Internal hex head

Torx head

O-ring boss port

Tip, helpful suggestion

Lubricate with hydraulic fluid

Apply grease / petroleum jelly

Apply locking compound

Inspect for wear or damage

Clean area or part

Be careful not to scratch or damage

Note correct orientation

Mark orientation for reinstallation

Torque specification

Press in - press fit

Pull out with tool – press fit

Cover splines with installation sleeve

Pressure measurement/gauge location or specification

The symbols above appear in the illustrations and text of this manual. They are intended to communicate helpful information at the point where it is most useful to the reader. In most instances, the appearance of the symbol itself denotes its meaning. The legend above defines each symbol and explains its purpose.

Design

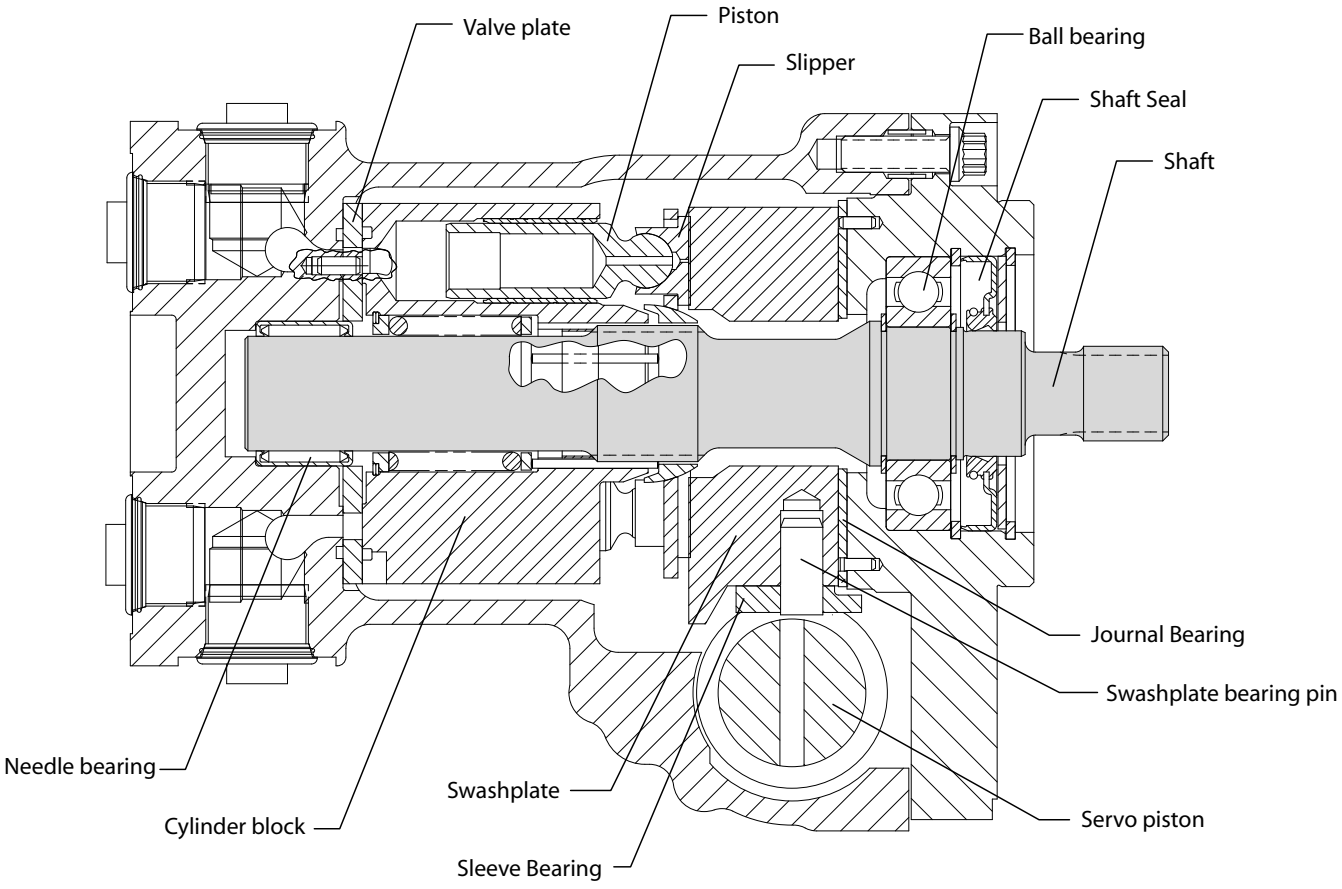
Danfoss Series 40 M46 closed circuit piston motors convert input hydraulic pressure and flow into output torque and rotational speed. High pressure fluid enters through the input port, and low pressure fluid exits through the exit port. The valve plate connects one half of the cylinder block to high pressure and the other half to low pressure. The high pressure fluid builds the piston assemblies. This causes the pistons to move down the swashplate (the path of least resistance). As the pistons return up the swashplate again, the fluid is allowed to exit through the exit port via the valve plate. There are seven pistons that move in a reciprocating motion as the fluid flows through the motor. These pistons are housed in the cylinder block assembly which rotates with the pistons. This cylinder block connects to the output shaft thus allowing the output torque to be applied to a mechanical function. A small amount of fluid is allowed to flow from the cylinder block/valve plate and slipper/swashplate interfaces for lubrication and cooling. Case drain ports return this fluid to the reservoir.

The volume of fluid displaced into the system is controlled by the angle of the swashplate. The swashplate is forced into an inclined position (into stroke) by the servo piston.

Introduction

The motor control, by varying the pressure at the servo piston, controls displacement and therefore the output speed of the shaft.

Cross section view



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The system circuit

The basic closed circuit

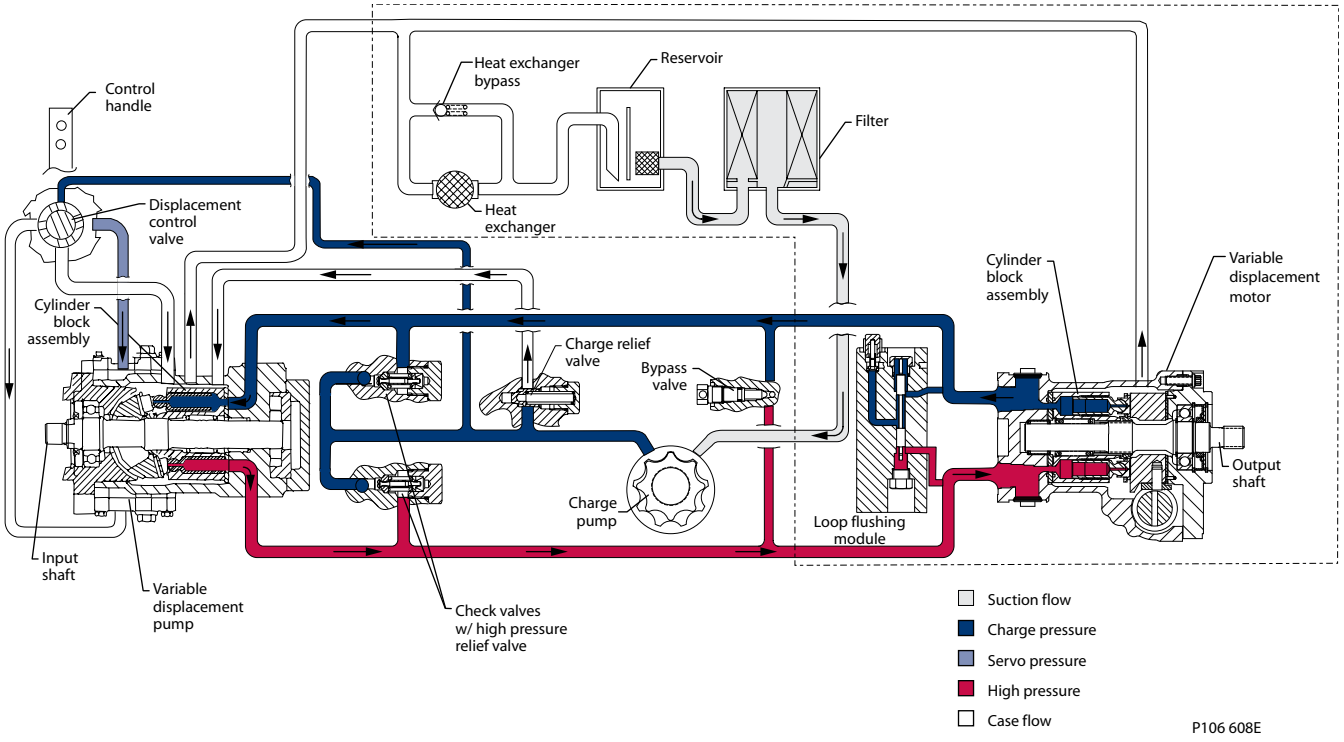
The main ports of the motor are connected by hydraulic lines to the main ports of the pump. Fluid flows, in either direction, from the pump to the motor then back to the pump in this closed circuit. Either of the hydraulic lines can be under high pressure. In pumping mode the position of the pumps swashplate determines which line is high pressure as well as the direction of fluid flow.

Case drain and heat exchanger

The pump and motor require case drain lines to remove hot fluid from the system. The pump and motor should be drained from their top most drain port to ensure the case remains full of fluid. The motor case drain can be connected to the lower drain port on the pump housing and out the top most port or feed into the case drain line coming from the pump ahead of the heat exchanger. A heat exchanger, with a bypass valve, is required to cool the case drain fluid before it returns to the reservoir.

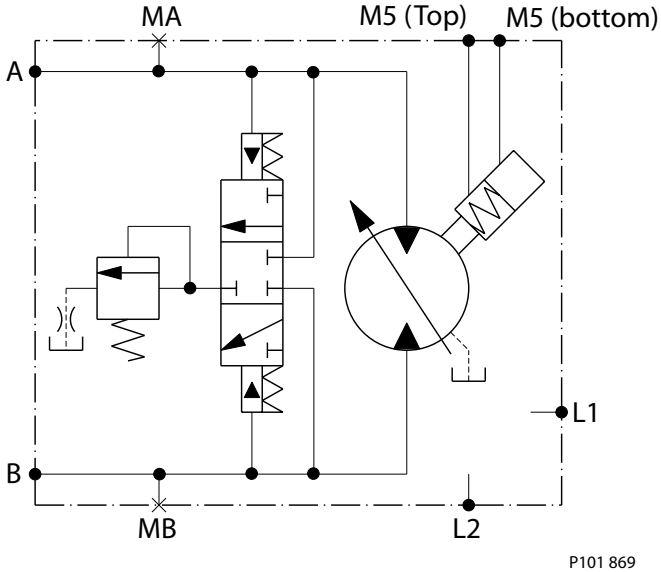
Introduction

System circuit diagram



Motor schematic

Motor schematic



Above schematic shows the function of a series 40 M46 variable displacement motor.

Fluid and filter maintenance

Fluid and filter recommendations

To ensure optimum motor life, perform regular maintenance of the fluid and filter. Contaminated fluid is the main cause of unit failure. Take care to maintain fluid cleanliness when servicing.

Check the reservoir daily for proper fluid level, the presence of water, and rancid fluid odor. Fluid contaminated by water may appear cloudy or milky, or free water may settle in the bottom of the reservoir. Rancid odor indicates the fluid has been exposed to excessive heat. Change the fluid immediately if these conditions occur. Correct the problem immediately.

Inspect vehicle for leaks daily.

Change the fluid and filter per the vehicle/machine manufacturer's recommendations or at these intervals:

First fluid change recommended at 500 hours.

Warning

High temperatures and pressures will result in accelerated fluid aging. More frequent fluid changes may be required.

Change the fluid more frequently if it becomes contaminated with foreign matter (dirt, water, grease, etc.) or if the fluid is subjected to temperature levels greater that the recommended maximum.

Dispose of used hydraulic fluid properly. Never reuse hydraulic fluid.

Change filters whenever the fluid is changed or when the filter indicator shows that it is necessary to change the filter. Replace all fluid lost during filter change.

Fluid and filter change interval

Reservoir type	Max oil change interval
Sealed	2000 hours
Breather	500 hours

Hazardous material

Warning

Hydraulic fluid contains hazardous material. Avoid contact with hydraulic fluid. Always dispose of used hydraulic fluid according to state, and federal environmental regulations.

Initial startup procedures

General

Follow this procedure when starting-up a new motor installation or when restarting an installation in which the motor has been removed and re-installed on a machine. Ensure the motor has been thoroughly tested on a test stand before installing on a machine.

Warning

Unintended movement of the machine or mechanism may cause injury to the technician or bystanders. To protect against unintended movement, secure the machine or disable/disconnect the mechanism while servicing.

Prior to installing the pump, inspect for damage that may have occurred during shipping.

Start-up procedure

1. Ensure that the machine's hydraulic oil and system components (reservoir, hoses, valves, fittings, and heat exchanger) are clean and free of any foreign material.
2. Install new system filter element(s) if necessary. Check that inlet line fittings are properly tightened and there are no air leaks.
3. Install the motor. Install a 50 bar [1000 psi] gauge in the charge pressure gauge port M4.
4. Fill the housing by adding filtered oil in the upper case drain port.
5. Fill the reservoir with hydraulic fluid of the recommended type and viscosity. Use a 10-micron reservoir filler filter. Ensure inlet line from reservoir to pump is filled.
6. Disconnect the motor from all control input signals.
7. Re-install construction plug removed in step 4.

   After start-up the oil level in the reservoir may drop due to filling of the system components. Check the level in the reservoir to maintain a full oil level throughout the start-up.

   Warning

   Damage to hydraulic components may occur if the oil supply is not maintained.
8. Use a common method to disable the engine to prevent the engine from starting. Crank the starter for several seconds. Do not to exceed the engine manufacturer's recommendation. Wait 30 seconds and then crank the engine a second time as stated above. This operation helps remove air from the system lines. Refill the reservoir to recommended full oil level.
9. When charge pressure begins to appear, enable and start engine. Let the engine run for a minimum of 30 seconds at low idle to allow the air to work itself out of the system. Check for leaks at all line connections and listen for cavitation. Check for proper fluid level in reservoir.

   Caution

   Air entrapment in oil under high pressure may damage hydraulic components.

   Caution

   Do not run at maximum pressure until system is free of air and fluid has been thoroughly filtered.
10. When adequate charge pressure is established (as shown in model code), increase engine speed to normal operating rpm to further purge residual air from the system.
11. Shut off engine. Connect motor and pump control signals. Start engine, checking to be certain pump remains in neutral. Run engine at normal operating speed and carefully check for forward and reverse control operation.
12. Continue to cycle between forward and reverse for at least five minutes to bleed all air and flush system contaminants out of loop.

    Normal charge pressure fluctuation may occur during forward and reverse operation.

Initial startup procedures

13. Check that the reservoir is full. Remove charge pressure gauge.

The motor is now ready for operation.

Pressure measurements

Required tools

The service procedures described in this manual can be performed using common mechanic's hand tools. Special tools, if required, are shown. When testing system pressures, calibrate pressure gauges frequently to ensure accuracy. Use snubbers to protect gauges.

Port and gauge installation

The following tables and drawing show the port locations and gauge sizes needed.

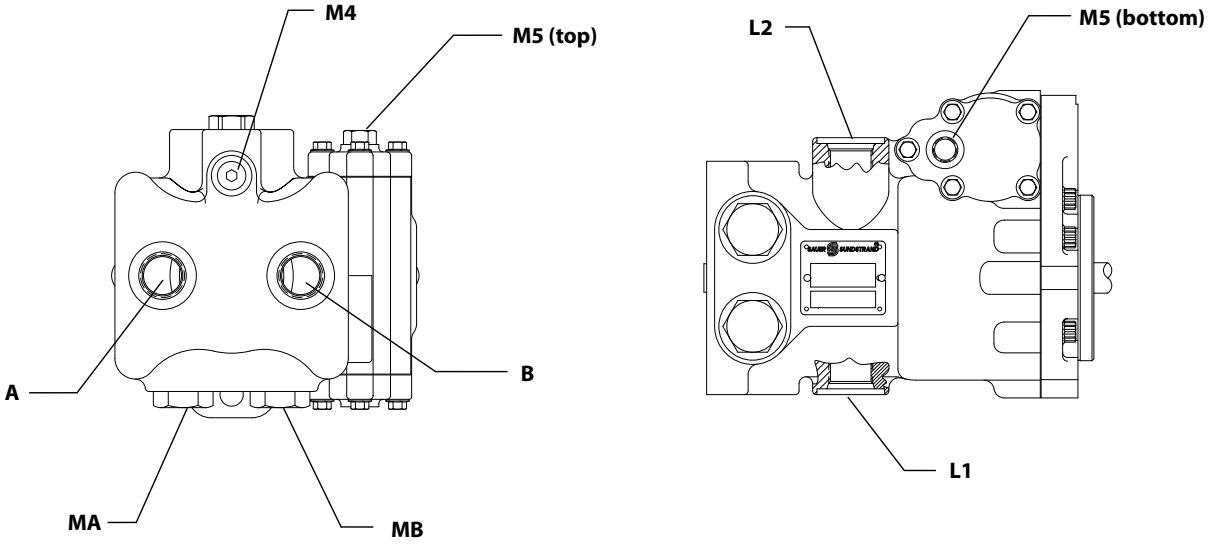
Port information

Port identifier	Port size	Wrench size	Pressure obtained	Gauge size, bar [psi]
L1, L2	1-1/16 12 SAE	9/16 internal hex	Case drain	10 [100]
MA, MB	1-1/16 12 SAE	1-1/4 hex	System pressure	600 [10,000]
M4	9/16-18 UNF	1/4 internal hex	Charge pressure	50 [1000]
M5	9/16-18 UNF	11/16 hex	Servo pressure	50 [1000]

System ports

Port identifier	Port size
A	1 1/16 -12 SAE
B	1 1/16 -12 SAE

Port locations



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Troubleshooting

Overview

This section provides general steps to follow if undesirable system conditions are observed. Follow the steps listed until the problem is solved. Some of the items will be system specific. For areas covered in this manual, a section is referenced. Always observe the safety precautions listed in *Introduction* on page 5, related to your specific equipment.

Safety precautions

Caution

High inlet vacuum causes cavitation which can damage internal pump components.

Warning

Escaping hydraulic fluid under pressure can have sufficient force to penetrate your skin causing serious injury and/or infection. Relieve pressure in the system before removing hoses, fittings, gauges, or components.

Warning

Unintended movement of the machine or mechanism may cause injury to the technician or bystanders. To protect against unintended movement, secure the machine or disable/disconnect the mechanism while servicing.

Caution

Contamination can damage internal components and void the manufacturer's warranty. Take precautions to ensure system cleanliness when removing and reinstalling system lines

Warning

Hydraulic fluid contains hazardous material. Avoid contact with hydraulic fluid. Always dispose of used hydraulic fluid according to state, and federal environmental regulations.

System operating hot

Item	Description	Action
Oil level in reservoir	Insufficient hydraulic fluid will not meet the cooling demands of system.	Fill the reservoir to the proper level with clean hydraulic oil.
Heat exchanger (if equipped)	The heat exchanger is not sufficiently cooling the system.	Check the air flow and input air temperature for the heat exchanger. Clean, repair, or replace the heat exchanger if necessary.
Oil filters	Clogged oil filters may result in an insufficient supply of cool oil to the system.	Inspect the oil filters and verify that they are still operable. Replace them if necessary.
Machine load	Excessive loads or extreme duty cycles could result in the motor operating at speeds and pressures beyond system design limitations.	Verify that the machine is operating within the parameters for which it was designed. If necessary, reduce the load on the machine.

Troubleshooting

System will not operate in one direction

Item	Description	Action
Motor input control pressure signal	A faulty control signal is being received at the pump. (HDC blocked or incorrectly orificed control lines)	Verify that the input signal being received is correct. Adjust, clean, repair, or replace the motor as necessary.
SCR (system check / relief) valves	The SCR valves on pump are malfunctioning or improperly set.	Verify that the SCR valves are operating properly. Repair or replace them as necessary.
Pump control	A damaged or biased pump control may be sending a signal commanding the pump to stroke only in one direction.	Verify that the pump's control is functioning properly. Repair or replace it as necessary.
Servo pressure	The drain or supply path to one side of the servo piston may be blocked.	Verify that the servo supply and drain paths are unobstructed and that any orifices are of the correct size and free of debris. Clean or repair them as necessary.
Displacement limiter	The displacement limiter may be improperly adjusted such that the servo piston is prevented from moving correctly.	Verify that the displacement limiter is adjusted properly.

System will not operate in either direction

Item	Description	Action
Oil level in reservoir	There is insufficient hydraulic fluid to supply the system loop.	Fill the reservoir to the proper level with clean hydraulic oil.
Input control pressure signal	A faulty control signal being received at the pump. (HDC blocked or incorrectly orificed control lines)	Verify that the input signal being received is correct. Adjust, clean, repair, or replace the motor as necessary.
Oil filters	Clogged oil filters may result in an insufficient supply of oil to the system.	Inspect the oil filters and verify that they are still serviceable. Replace them if necessary.
Servo pressure	There is an insufficient pressure differential across the servo piston.	Check servo pressures to verify sufficient pressure delta. Verify that the servo supply and drain paths are unobstructed and that any orifices are of the correct size and free of debris. Clean, repair, or replace them as necessary.
Displacement limiter	Displacement limiter may be improperly adjusted such that the servo piston cannot move properly.	Verify that the displacement limiter is adjusted to the proper setting.

System response is sluggish

Item	Description	Action
Reservoir oil level	There is an insufficient amount of hydraulic fluid, resulting in an inadequate supply for the system loop.	Fill the reservoir to the proper level with clean hydraulic fluid.
Input control pressure signal	A faulty control signal is being received at the pump. (HDC blocked or incorrectly orificed control lines)	Verify that the input signal being received is correct. Adjust, clean, repair, or replace motor as necessary.

Troubleshooting

Neutral difficult or impossible to find

Item	Description	Action
Input control pressure signal	A faulty control signal is being received at the pump. (HDC blocked or incorrectly orificed control lines)	Verify that the input signal being received is correct. Adjust, clean, repair, or replace motor as necessary.
System pressure	With no input signal to the control, a pressure delta may exist between the two sides of the working loop.	Readjust pump neutral setting.
Servo pressure	With no input signal to the control, a pressure delta may exist across the servo piston.	Readjust the control neutral setting.

System noise or vibration

Item	Description	Action
Reservoir oil level	Low oil level leads to cavitation.	Fill reservoir.
Shaft couplings	A loose shaft coupling will cause excessive noise.	Replace loose shaft coupling or motor shaft.
Shaft alignment	Misaligned shafts creates noise	Align shaft.
Charge/system relief valves	Unusual noise may indicate sticking valves. Possible contamination.	Clean/replace valves and test motor. May be a normal condition.

Adjustments

Standard procedures, inspections, and adjustments

Before working on the motor, clean all dirt and grime from the outside of the motor.

Warning

Contamination can damage internal components and void the manufacturer's warranty. Take precautions to ensure system cleanliness when removing and reinstalling system lines

1. Thoroughly clean all dirt and grime from the outside of the motor.
2. If removing the motor, tag each hydraulic line connected to the motor. If hydraulic lines are disconnected, plug each open port, to ensure that dirt and contamination does not get into the motor.
3. Ensure the surrounding areas are clean and free of contaminants such as dirt and grime.
4. Inspect the system for contamination.
5. Look at the hydraulic fluid for signs of system contamination, oil discoloration, foam in the oil, sludge, or small metal particles.
6. If there are signs of contamination in the hydraulic fluid, all filters must be replaced and the hydraulic system must be drained and filled with the correct hydraulic fluid.
7. Flush the lines before replacing the hydraulic fluid.
8. Before re-installing the pump, perform a leakage test per Danfoss leakage test HPP 112.

Warranty

Performing adjustments and minor repairs according to the procedures in this manual will not affect your warranty. Major repairs requiring the removal of a unit's rear cover, servo sleeves or front flange voids the warranty unless done by a Danfoss Global Service Partner.

Motor adjustment

This section offers instruction on inspection and adjustment of motor components. Read through the entire topic before beginning a service activity. Refer to *Port and gauge installation* on page 13 for location of gauge ports and suggested gauge size.

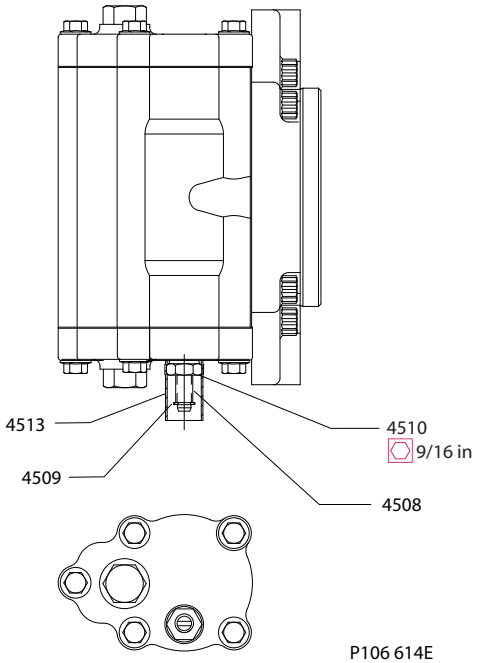
Displacement limiter adjustment

Displacement limiters are not pre-set by the factory but are installed to minimize the extension of the adjustment screw. Adjustment displacement limiter after installation until desired maximum motor displacement is achieved.

1. Using a flat screw driver and a 9/16 hex wrench, loosen the locking nut (4510).
2. Rotate the adjusting screw (4508) based on the following table. Rotating the adjusting screw clockwise decreases the maximum displacement of motor. Rotating the adjusting screw counterclockwise increases the maximum displacement of motor.
3. After establishing the desired displacement setting, use a flat screw driver to hold adjusting screw in place and tighten the locking nut with a 9/16 hex wrench. Torque to 15 Nm [11 lbf•ft].
4. One turn of the adjusting screw will change the maximum displacement approximately as follows. The sdjusting screw most commonly requires a flat screw driver, but may require a hex wrench or an internal hex wrench.

Adjustments

Displacement limiter adjustment



Displacement limiter adjustment data

Displacement	Locknut wrench size and torque	Adjusting screw size	Approximate displacement change per revolution of adjusting screw
46	9/16 15 N•m [11 lbf•ft]	flat screw driver	4.1 cc / turn

Minor repair

Standard procedures, removing the motor

Before working on the motor, clean all dirt and grime from the outside of the motor.

Tag all hydraulic lines as they are disconnected and plug all open ports, to ensure that dirt and contamination do not get into the motor.

Caution

Contamination can damage internal components and void the manufacturer's warranty. Take precautions to ensure system cleanliness when removing and reinstalling system lines.

Removal

1. Thoroughly clean all dirt and grime from the outside of the motor.
2. Tag and disconnect each hydraulic line connected to the pump. As hydraulic lines are disconnected, plug each open port, to ensure that dirt and contamination do not get into the motor.
3. Remove the motor as a single unit.

Caution

Be careful not to damage motor when using straps or chains to remove motor from machine.

Inspection

1. Ensure the work surface and surrounding area are clean and free of contaminants such as dirt and grime.
2. Look at the hydraulic fluid for signs of system contamination, oil discoloration, foam in the oil, sludge, or small metal particles. Inspect the motor for damage.

Reassembly

1. Before replacing the motor on the machine, replace all filters and drain the hydraulic system fill it with the correct hydraulic fluid.
2. Flush the lines before replacing the hydraulic fluid.

Shaft seal, ball bearing and shaft replacement

The shaft assembly is serviceable without disassembling the motor. Orient the pump on the work surface so the shaft is pointing up.

Removal

Shaft and bearing assembly can be inspected without disassembly. Only disassemble shaft assembly if shaft or bearing need to be replaced.

1. Using a snap ring pliers, remove the snap ring (4117) from the front housing.
2. Remove seal washer (4142). Remove and discard shaft seal (4210).
3. Using a snap ring pliers, remove snap ring (4117) and use an appropriate puller to pull the shaft (4201) with bearing (4116) out of the motor. If necessary, tap on the shaft to dislodge it from the internal pump components.

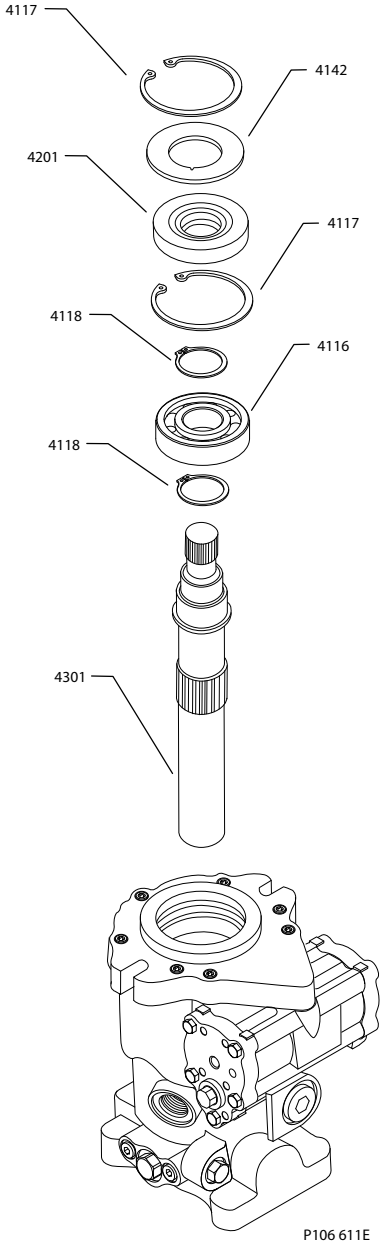
Caution

Do not damage the housing bore, shaft, or bearing when removing the shaft and shaft seal.

4. Using a snap ring pliers, remove snap ring (4118). Using a bearing puller or press, remove bearing (4116) from shaft (4117). Using a snap ring pliers, remove snap ring (4118).

Minor repair

Repair shaft



Inspection

Inspect the shaft and bearing for wear, scratching and pits. If wear, scratching or pitting is found, or the bearing doesn't spin freely on the shaft, replace the shaft, bearing or entire assembly.

Reassembly

1. Using a snap ring pliers, install snap ring (4118). Press the bearing onto the shaft.
2. Using a snap ring pliers, install snap ring (4118). Lubricate and install the shaft assembly into the motor.
3. Using a snap ring pliers install snap ring (4117).
4. Lubricate shaft seal. Using an appropriate seal press, install shaft seal (4201) and seal washer (4142).

Minor repair

5. Using a snap ring pliers, install snap ring (4117).

Loop Flushing spool

Replace loop flushing spool if necessary.

Removal

1. Using a 11/16 hex wrench, remove plugs (4606). Remove and discard O-rings (4606A) from plugs (4606).
2. Remove springs (4607), spring stops (4609), and loop flushing spool (4610) from port.

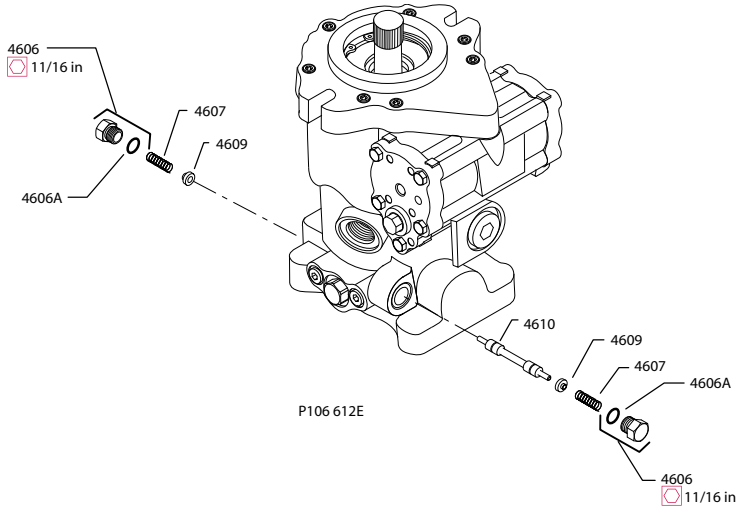
Inspection

Inspect the loop flushing spool for wear, scratching and pits. If wear, scratching or pitting is found, the spool, replace the loop flushing spool. Ensure that the spool moves smoothly in the housing during installation. If it doesn't, ensure that the housing is free from contamination. If the housing is clean and the spool still doesn't move smoothly, replace the spool.

Reassembly

1. Lubricate and install loop flushing spool (4610) into motor housing.
2. Install spring stops (4609) and springs (4607).
3. Lubricate and install O-rings (4606A) onto plugs (4606).
4. Using a 11/16 hex wrench, install plugs (4606). Torque to 37 Nm [27 ft•lb].

Replace loop flushing spool



Displacement Limiter

The displacement limiter is adjusted to different settings depending on desired motor output. See *Displacement limiter adjustment* on page 17, for adjustment instructions.

Removal

1. Remove servo stop cover (4513) and servo stop seal ring (4509). Using a flat screw driver and a 9/16 hex wrench, remove nut (4510).
2. Using a 7/16 hex wrench, remove five screws (4131) from servo cover (4507).
3. Remove servo cover (4507). Remove and discard servo cover gasket (4143).

Minor repair

4. Unscrew displacement adjustment screw (4508) from servo cover (4507).

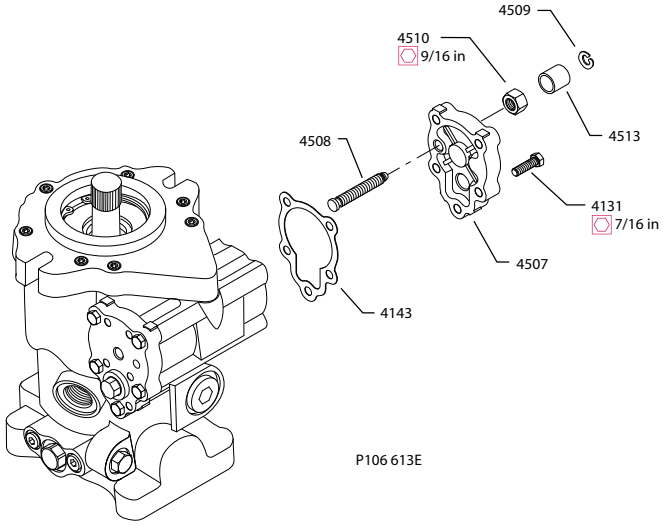
Inspection

1. Inspect the sealing surfaces of the motor and servo cover for nicks or scratches.
2. Inspect servo stop. If bent or damaged replace servo stop.

Reassembly

1. Turn servo stop (4508) into servo cover (4507). Install servo cover gasket (4143).
2. Install servo cover (4507). Using a 7/16 hex wrench install five bolts (4131). Torque in a star pattern to 15 Nm [11 ft•lb].
3. Using a flat screw driver and a 9/16 hex wrench, adjust servo stop to position marked in disassembly and install servo stop seal nut (4510). Torque to 12 Nm [9 ft•lb].
4. Install servo stop seal ring (4509) and servo stop cover (4513),

Repair displacement limiter



Torque chart

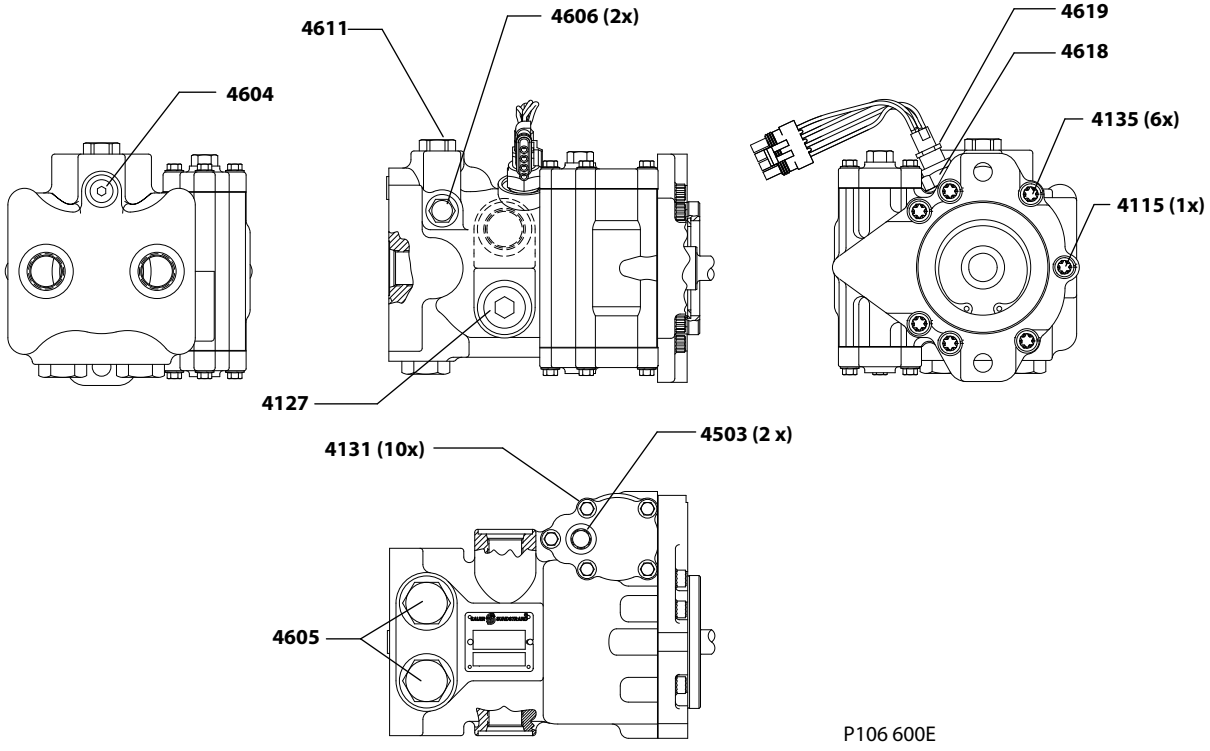
Fastener size and torque chart

Item	Fastener	Wrench size	Torque
4131	Servo piston cover screws	7/16 hex	15 Nm [11 ft•lb]
4115	Front cover screw	T50 Torx	58 Nm [43 ft•lb]
4135	Front cover screws	T55 Torx	91 Nm [67 ft•lb]
4618	Speed sensor adapter	1 inch hex	100 Nm [74 ft•lb]
4619	Speed sensor nut	11/16 hex	13 Nm [10 ft•lb]

Plug size and torque chart

Item	O-ring plug	Wrench size	Torque
4127	1-1/16 12 SAE	9/16 internal hex	115 Nm [85 ft•lb
4503	9/16 18 SAE	11/16 hex	37 Nm [27 ft•lb]
4604	9/16 18 UNF	1/4 internal hex	24 Nm [18 ft•lb]
4605	1-1/16 12 SAE	1-1/4 hex	170 Nm [125 ft•lb]
4606	9/16 18 UNF	11/16 hex	37 Nm [27 ft•lb]
4611	7/8 18 UNF	1 inch hex	108 Nm [80 ft•lb]

Hardware locations



P106 600E

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